

## AIR POLLUTION

## Gate Wait for Better Air

Commercial jets may spend as much as 30% of their total flight time taxiing on the tarmac before takeoff.<sup>1</sup> In the United States, this “taxi-out time” translates into 6 million metric tons of carbon dioxide, 45,000 metric tons of carbon monoxide, 8,000 metric tons of nitrogen oxides, and 4,000 metric tons of hydrocarbons emitted into the atmosphere yearly.<sup>1</sup> Holding planes at the gate for fewer than 5 extra minutes may be a simple way to reduce these emissions, according to a pilot study conducted at Boston Logan International Airport by researchers at the Massachusetts Institute of Technology (MIT).<sup>2</sup>

The MIT team studied departure data from Logan and developed models to minimize runway congestion by increasing the amount of time planes spent at the gate. Working with the Federal Aviation Administration (FAA) and air traffic controllers, the MIT team ran eight 4-hour tests in August and September 2010 during Logan’s busiest arrival and departure times.

The average taxi-out time at Logan is about 20 minutes. Holding 247 flights at the gate for an average of 4.3 extra minutes reduced taxiing time by an average of 20%, and fuel consumption dropped by 16–20 gallons per plane. Takeoff times were not delayed, because once planes pushed back they proceeded quickly to takeoff. About 18 hours of taxi-out time were eliminated over the course of the study, resulting in an overall estimated fuel savings of 3,900–4,900 gallons.

This simple strategy offers a potential win-win situation for airports, airlines, and neighboring communities whose air is polluted by airport emissions. Air traffic controllers and aircraft pilots “were very positive and liked the fluid flow of aircraft on the ground instead of long queues,” says study leader Hamsa Balakrishnan. She’s working with the FAA to improve the method and test it at other congested

airports. The team is also working on a model to estimate emissions avoided through the reduction in fuel consumption.

Hazardous air pollutants measured at or near airports include nitrogen dioxide, polycyclic aromatic hydrocarbons, fine particles, carbonyls, and volatile organic compounds.<sup>3,4,5</sup> These pollutants have been generally linked to cancer,<sup>6</sup> heart attack,<sup>7</sup> and type 1 diabetes.<sup>8</sup> In one study, people living within 5 miles of airports were 1.5 times more likely than people living farther away to be admitted to hospitals for a variety of respiratory diseases.<sup>9</sup>

“It’s important that we minimize emissions,” says Lourdes Maurice, executive director for environment and energy at the FAA. Although it remains to be seen whether reduced taxi-out times at other airports will translate into significant fuel savings and emissions reductions, Maurice says, “The initial benefits look very good and we are continuing efforts with MIT.”

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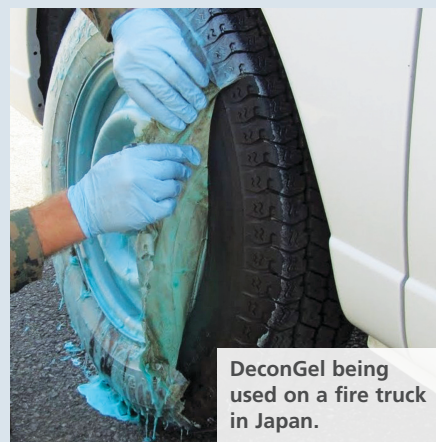
## The Beat

by Erin E. Dooley

### Gel Tackles Tohoku Waste

CNN reports Japanese officials are using a product called DeconGel to clean up areas contaminated by the March 2011 Tohoku earthquake and tsunami.<sup>1</sup> The product is applied as a liquid to surfaces contaminated by hazardous chemicals or radiation and then dries into a gel that

can be peeled off, taking contaminants with it. DeconGel has been used to clean up polychlorinated biphenyls, mercury, chromium, beryllium, and radioactive materials. Although the product can’t neutralize radioactivity—no product can—its developer claims it can reduce labor and disposal costs.<sup>2</sup>



DeconGel being used on a fire truck in Japan.

### 12th Report on Carcinogens Released

In the 12th *Report on Carcinogens*, released in June 2011, the National Toxicology Program adds two substances to the list of known human carcinogens: formaldehyde (formerly listed as reasonably anticipated to be a human carcinogen) and aristolochic acids (botanical chemicals found in some *Aristolochia*- and *Asarum*-based herbal remedies, which are listed for the first time).<sup>3</sup> The new report also adds six entries to the list of substances reasonably anticipated to be human carcinogens: capatafol (a fungicide),

cobalt-tungsten carbides in powder or hard metal form, certain inhalable glass wool fibers, riddelline (a compound found in *Senecio*-based herbal remedies), and the industrial chemicals *o*-nitrotoluene and styrene.

### IARC Classifies Radiofrequency Electromagnetic Fields

In May 2011 the International Agency for Research on Cancer (IARC) classified radiofrequency electromagnetic fields like those emitted by cell phones as possibly carcinogenic to humans.<sup>4</sup> The agency based its decision on limited evidence suggesting an increased risk for glioma (a malignant type of brain cancer) and acoustic neuroma (a benign tumor of the nerve connecting the ear to the brain) associated with cell phone use. The group also concluded there is inadequate evidence to draw conclusions for other types of cancers. The number of cell phone users worldwide is currently estimated at more than 5 billion.<sup>5</sup>

## NATURAL RESOURCES

## Methane Found in Well Water Near Fracking Sites

In a study of 68 private drinking water wells in northeastern Pennsylvania and New York, methane contamination rose sharply with proximity to natural gas drilling and hydraulic fracturing (“fracking”) sites.<sup>1</sup> The average methane concentration in shallow groundwater in active drilling areas fell within the defined action level (>10 mg/L but <28 mg/L) for hazard mitigation recommended by the U.S. Department of the Interior, and the maximum (64 mg/L) was well beyond that threshold, according to the report. However, the researchers found no evidence of fracturing fluids. Principal investigator Robert B. Jackson of Duke University says fracking has been conducted in the sampled region since about 2008. The team sampled the water supplies in 2010.

The researchers measured concentrations of gases and certain isotopes of carbon in methane and other hydrocarbons to distinguish the ancient thermogenic gas stores sought in drilling operations from methane generated by microbial degradation of organic matter. The closer the well was to an active drilling site, the more likely it was the methane detected was thermogenic.

Flammable levels of natural gas are common in water supplies, and explosions—even reports of flammable drinking water—have occurred near fracking sites, says Abraham Lustgarten, a reporter for ProPublica who has investigated gas drilling across the United States. But no peer-reviewed studies have investigated health effects of chronic ingestion of small amounts of methane, Jackson says.<sup>2</sup>

John Hanger, a former head of the Pennsylvania Department of Environmental Protection (DEP), blames poor gas well construction or design, not fracking, for methane contamination noted to date.

He says repairs or plugging of gas wells eliminated contamination in 14 of 19 previously contaminated water wells tested in 2010 by the DEP. But Jackson maintains fracking cannot be ruled out as a cause, given the high pressures used in the practice.

Just how likely are leaks? Based on a non-peer-reviewed survey of the five states that systematically report incidents at wells where fracking occurs and where complaints have spurred inspections, Ronald E. Bishop, a lecturer in chemistry and biochemistry at the State University of New York, Oneonta, estimates nearly 2% of such gas wells may end up contaminating groundwater with fracking fluids.<sup>3</sup> Bishop says 50% of new natural gas wells recently inspected in Quebec leaked methane.<sup>4</sup>

Hanger says Pennsylvania has enacted strict standards for design, construction, and materials used in gas wells, which became effective in February 2011.<sup>5</sup> The state also requires testing, monitoring, and disclosure of chemicals used in fracking. But Amy Mall, a senior policy analyst with the Natural Resources Defense Council, says state fracking regulations vary widely, and a federal law passed in 2005 exempts fracking from the Safe Drinking Water Act and companies from disclosing chemicals used during the process.

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## Study to Assess Health Effects of Railyard

In June 2011 California's South Coast Air Quality Management District announced the launch of a two-year study on the Burlington Northern Santa Fe railyard in San Bernardino, a major transportation hub for the Los Angeles–Long Beach port complex. The study, to be conducted by Loma Linda University, will examine respiratory diseases and cancer among 1,200 children and adults in communities surrounding the railyard. A 2008 California Air Resources Board health risk assessment suggested the San Bernardino facility had the worst health impact on surrounding communities of any railyard in California.<sup>6</sup>

## Elders Volunteer for Fukushima Daiichi Plant Cleanup

Retired engineer Yasuteru Yamada received more than 300 responses when he solicited elderly colleagues to volunteer to help stabilize and clean up the



Several projects in California seek to reduce the community health impacts of railyards.

Fukushima Daiichi nuclear plant damaged by the 11 March 2011 Tohoku earthquake and tsunami.<sup>7</sup> Yamada, a cancer survivor, says elders should lead these efforts because of their accumulated experience and because their advanced age means the adverse effects of radiation exposure

will have less time to manifest. Yamada's Skilled Veterans Corps is expected to receive governmental approval to help at the damaged plant.

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